Journal of Student Financial Aid

Volume 26 | Issue 3 Article 3

12-1-1996

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Pricing Differences Among Private Colleges: The Impact of Discounting Through College-Funded Grants

By Donald L. Basch

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Substantial differences in discounting exist among private, not-for-profit, four-year colleges. Such differences must be considered to provide an accurate characterization of the actual differences among colleges in pricing. Differences across colleges in discounting appear related to differences in admissions selectivity, nominal price, endowment per student, and regional location. For those who admire how very selective, high price colleges offer substantial aid packages to needy accepted students and ignore need in their admissions decisions, there is a challenging irony. One reason many of these colleges can sustain such policies is that stringent selectivity and high price may lower the percentage of needy students.

Colleges' pricing has been the subject of intense scrutiny in recent years. Much of the scrutiny has appropriately been from the perspective of students and has emphasized the sharp increases in colleges' nominal (or sticker) prices. However, the pricing issue from the perspective of colleges has also been written about. From the colleges' perspective, an important element has been the rapid increase in college-funded grant aid, which is essentially a price discount. Recent research and thought have focused on how colleges should set prices in conjunction with types of aid–including college-funded grant aid–to best achieve the colleges' multiple objectives. While building on national studies of students' price sensitivity, researchers have also recognized that local conditions, including characteristics specific to different colleges within a particular locale, should be considered when a college sets its pricing strategy. (Breneman, 1994; Bryan and Whipple, 1995; Hamm, 1995; Rothman, 1995; St. John, 1995, 1994a, 1994b, 1992, 1990a, 1990b; St. John and Starkey, 1995; Somers, 1995; and Somers and St. John, 1993).

Yet, while discounting has been well documented overall (see, e.g., College Board, 1995 and Hauptman, 1990), fewer efforts have been made to describe and explain discounting differences. An understanding of such differences is important if one is to gain a full picture of how colleges differ in the average amount they collect from students. If colleges with higher prices offer higher college-funded discounts, then apparent differences may virtually disappear once the average discount is subtracted. On the other hand, differences in nominal prices would understate the differences in actual amounts collected from students if those colleges with higher prices offered lower discounts. Getting an accurate picture of differences in net prices received by colleges requires knowing average college-funded discounts.

The present study focuses on differences among private colleges of

college-funded grant aid and in the revenue these colleges receive from students. This is all calculated before and after the impact of price discounting. No attempt is made to prescribe appropriate pricing strategies. The emphasis is on describing the pattern of differences that existed as of the 1991-92 academic year and on explaining how these differences have arisen. This is not the first study: Breneman (1994) provided an interesting view of differences among liberal arts colleges and McPherson et al. (1989) emphasized differences among institutions classified by level of institution (two-year college, four-year college, and university) and by endowment per student. The present study draws upon a Peterson's survey that has the advantages of providing *college-by-college* data. This gives us an opportunity to explore differences among colleges. Our study focuses on aid to full-time first-year undergraduates. The study also examines college-funded grant aid and other forms of aid including self-help and externally-funded grants and data on the percentage of students judged needy and receiving aid. We would like to gain an understanding of how college-funded grant aid fits into the overall aid packages awarded at different colleges.

Are there substantial differences among private undergraduate colleges in discounting through college grants? If differences in discounting do exist, how do the resulting differences in net prices–i.e., net of the discounting–compare to the differences in nominal prices? Is the pattern of differences in discounting among private colleges systematically related to differences among colleges in their internal and environmental characteristics?

How Is the College Price Gap Affected by Discounting?

The main data source for this study is Peterson's Freshman Financial Aid Database. It focuses on financial aid given to enrolled full-time freshmen judged needy by the college being surveyed.[1] In the Peterson's survey, colleges are instructed to include both need-based and merit aid to these first year students. One advantage of this source is that it is college-specific. Also, forms of aid, including college-funded grants, externally-funded grants, loans, and work-study *are* included and graduate student aid *is not* included.[2]

A first disadvantage is that it is for full-time freshmen only, and there is no way to examine whether the full-time first year students represent all undergraduates at the college. Further, although merit aid is mentioned, there is no identification of how much merit aid goes to needy versus non-needy freshmen. Thus, this study concentrates on *needy* full-time first year students. The data on financial aid, in combination with other data needed on pricing, are available for 447 private, not-for-profit, four-year colleges.

Tables 1 and 2 offer an overall perspective on the colleges for academic year 1991-92. Table 1 gives aggregate data, i.e., the totals for the 447 colleges are added. Of the 189,338 full-time freshmen, 60.5% were judged needy and 60.0% received some form of aid. In the aggregate, these colleges charged their full-time freshmen $2.855 billion for tuition, mandatory fees, and room and board. With college-funded grants to needy first year students totaling $517 million, 18.1% of the $2.855 billion is discounted by the colleges.

Table 2 offers median data. At the median college, 67.5% of the full-time freshmen were judged needy. The median price (tuition, mandatory fees, and

TABLE 1
Aggregates for Full-Time Freshmen at 447 Private Colleges
Academic Year 1991-92

	Amount (millions)	Amount as % of Tuition, Fees, Room and Board
Total Revenue (Tuition, Fees, Room and Board)	$2,854.5	100.0%
Total Tuition and Fees	2,141.5	75.0
Total Aid to Needy Freshmen	1,133.1	39.7
Self-Help	358.3	12.6
All Grants	774.9	27.1
Funded Externally (Not by Colleges)	257.9	9.0
Grants Funded by Colleges	517.0	18.1
Total Net Revenue (Tuition, Fees, Room and Board Net of College-Funded Grants to Needy Freshmen)	2,337.6	81.9
Total Net Tuition and Fees (Tuition and Fees Net of College-Funded Grants to Needy Freshmen)	1,624.5	56.9

Note: In 1991-92, 60.5% of the 189,338 full-time freshmen were judged needy and 60.0% received some form of need-based aid.

Sources: For data on financial aid, Peterson's Freshman Financial Aid Database. Peterson's Freshman Financial Aid Database is compiled, owned, and copyrighted by Peterson's Guides, Inc.; all rights are reserved by Peterson's.

For data on tuition, fees, room and board, College Board (1991), supplemented as needed by Chronicle of Higher Education (1991), Peterson's Guides (1991), and Barron's (1992). For data on the percentage of students living in college housing, College Board (1992).

room and board adjusted for the number of students living on campus) was $12,946.[3] The median average college-funded grant–taking the total amount of college-funded grants to needy full-time freshmen and dividing by the total number of full-time freshmen–was $2,279. At the median college, the average college-funded grant was 17.4% of the nominal price.[4]

The aggregate and median data offer an overall view of a typical college. We now turn to data that characterize differences among colleges. Figure 1 shows the distributions of colleges for full-time needy freshmen, average college-funded grant, and discount rate. With private undergraduate colleges charging a range of prices, it is not surprising that the proportion of needy

TABLE 2
Medians of 447 Private Colleges Per Full-Time Freshmen
1991-92 Academic Year

Median Nominal Price	$12,946
Median Percentage Judged Needy	67.5%
Median Percentage Receiving Aid	66.8%
Median Average Total Aid/Freshman	$ 5,958
Median Average Self-Help/Freshman	1,863
Median Average Grant/Freshman	3,882
Median Average Externally-Funded Grant/Freshman	1,399
Median Average College-Funded Grant/Freshman	2,279
Median Net Price	$10,523
Median Average College-Funded Grant/Freshman as a Percentage of Nominal Price	17.4%

Sources: Same as Table 1 on page 43.

students and average college-funded grants varies substantially. Perhaps of more interest is the average college-funded grant as a percent of the stated price. Figure 1 shows a wide distribution for such discount rates.

Colleges with higher prices use discounting differently than colleges with lower prices. This is because of the direct impact of stated price and because of the correlation of price with other college characteristics such as admissions selectivity. After taking into consideration differences in discount rates, is the gap between higher- and lower-priced colleges lessened or increased? In other words, having netted out discounts of college-funded grants to full-time needy freshmen, how does the distribution of colleges by *net* price compare with that for *nominal* price? Figure 2 shows the distributions and identifies the median, mean, standard deviation, and coefficient of variation. As reflected in the variation decrease, the distribution for net prices is somewhat, but not dramatically, more concentrated than its nominal price counterpart.

Similarly, as shown in Table 3, if one ranks colleges by their price, the median average college-funded grant as a percentage of this price is usually higher in the higher quintiles of colleges than in the lower quintiles. The relationship is not perfectly uniform. If one divides the colleges into deciles, a step to a higher decile is not always associated with a higher discount rate and, indeed, the highest discount rate tends to occur in the 9th decile. In general, higher stated price is associated with a higher discount rate. Thus, the percentage gap between higher and lower priced colleges is lower for net prices than for stated prices–though the extent of narrowing due to discounting is not dramatic.

In Table 3, one also observes an interesting contrast. As one moves to higher quintiles of price, the percentage of needy students *declines* (the one exception being the move from the lowest to the second quintile). By contrast, the average college-funded grant and the discount rate at higher-priced colleges tend to be *higher* than at lower-priced colleges.

Table 4, which focuses on recipient data, helps answer a question raised

by the data of Table 3. How is it that at the higher-priced colleges, higher discounting occurs despite the fact that fewer students are needy? The higher-priced colleges have a lower percentage of needy students than the lower-priced colleges, but the students who are needy tend to have more need and receive more total aid per recipient. Average self-help per recipient and average externally-funded grant per recipient are not sufficiently higher at the higher-priced colleges to offset the higher total aid per recipient. Thus, the average college-funded grant per recipient is sharply higher. In short, fewer students are receiving aid at the higher-priced colleges. Those receiving college-funded grants are receiving so much more per recipient that the average college-funded grant per full-time freshman and the overall discount rates are higher.

A Multivariate Explanation of College Differences

Organizing the discounting data by nominal price reveals some interesting patterns, but more questions arise. While stated price may have a direct impact on discounting, part of the impact may be due to other college characteristics. Indeed, the very level at which price is set is likely to be influenced by these other characteristics, such as the colleges' reputation for admissions selectivity. A multivariate regression analysis holds the promise of helping to sort out the impact of admissions selectivity, nominal price, and other college characteristics. The three main dimensions of discounting cited in this study include percentage of needy students, average college-funded grant, and discount rate.

Admissions selectivity could be expected to exert an influence on the extent of discounting through several avenues. First, admissions selectivity could affect the mix of students accepted and enrolled at the college. The particular selection criteria at the more selective colleges may, without any explicit college effort, attract a higher income/wealthier group of students than at less

TABLE 3
Aspects of Price and Financial Aid for Needy Full-Time Freshmen Per Full-Time Freshman Organized by Nominal Price Quintile, Academic Year 1991-92

	Lowest Quintile	Second Quintile	Middle Quintile	Fourth Quintile	Highest Quintile	All
Number of Colleges	89	90	89	90	89	447
Median Nominal Price	$7,784	$10,706	$12,946	$15,169	$20,101	$12,946
Median Percentage Judged Needy	74.2%	75.6%	69.6%	65.4%	49.6%	67.5%
Median Percentage Receiving Aid as Needy	73.2%	75.5%	68.9%	65.4%	49.6%	66.8%
Median Average Total Aid	$4,261	$5,812	$6,232	$6,363	$6,860	$5,958
Median Average Self-Help	1,724	2,112	2,118	1,982	1,648	1,863
Median Average Grant	2,519	3,692	3,891	4,323	5,297	3,882
Median Average Externally-Funded Grant	1,461	1,850	1,527	1,240	977	1,399
Median Average College-Funded Grant	985	1,720	2,207	3,023	4,222	2,279
Median Net Price	6,757	8,975	10,637	12,420	15,946	10,523
Median Average College-Funded Grant as a Percentage of Nominal Price	12.9%	15.9%	17.3%	19.3%	20.9%	17.4%

Sources: Same as Table 1 on page 43.

FIGURE 1
Proportion of Full-Time Freshmen Judged Needy, Average College-Funded Grant, and Discount Rate Distribution of 447 Colleges, 1991-92 Academic Year

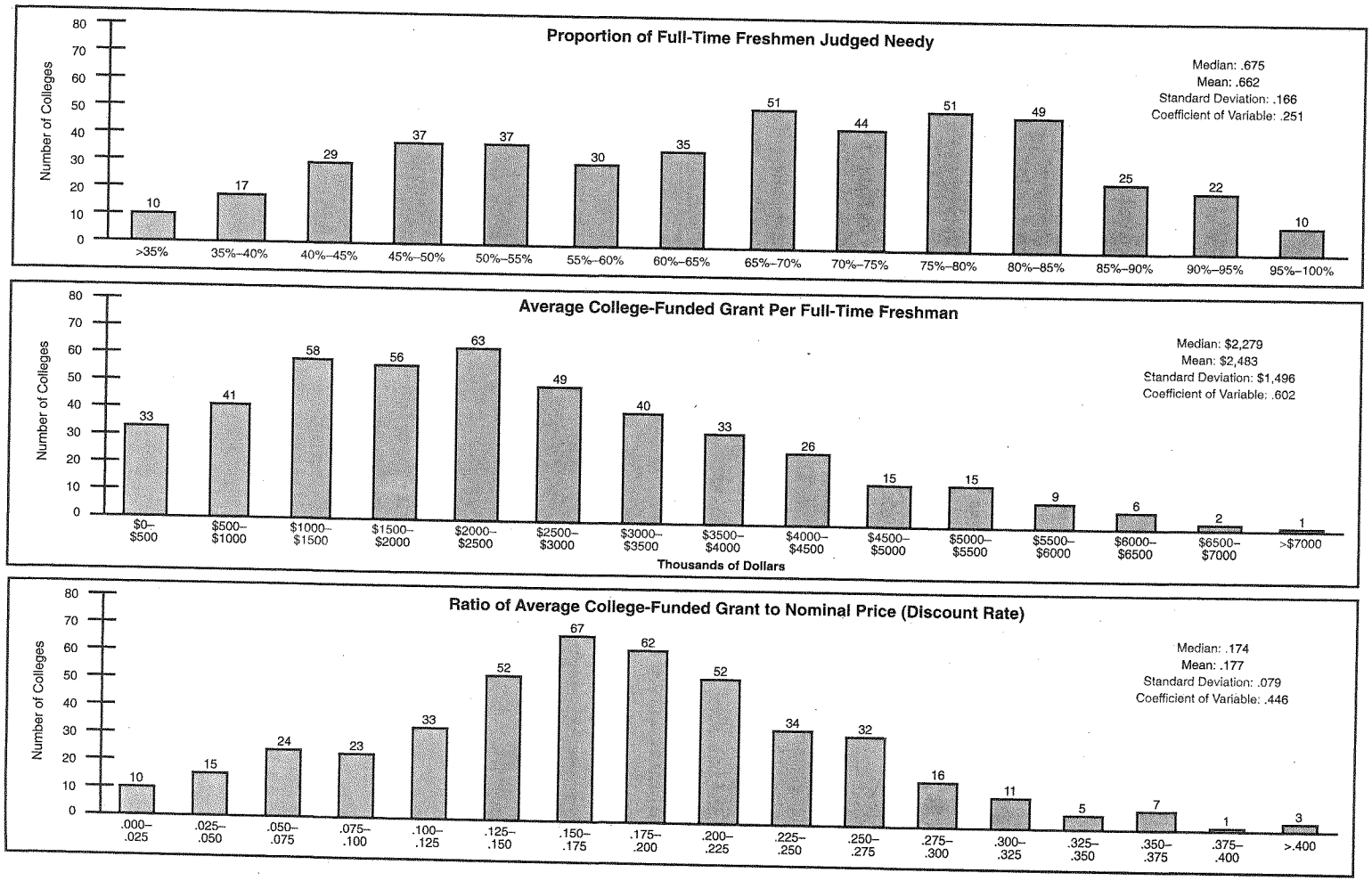

FIGURE 2
Nominal Price Versus Net Price (After Netting Out Average College-Funded Grant)
Distribution of 447 Colleges, 1991-92 Academic Year

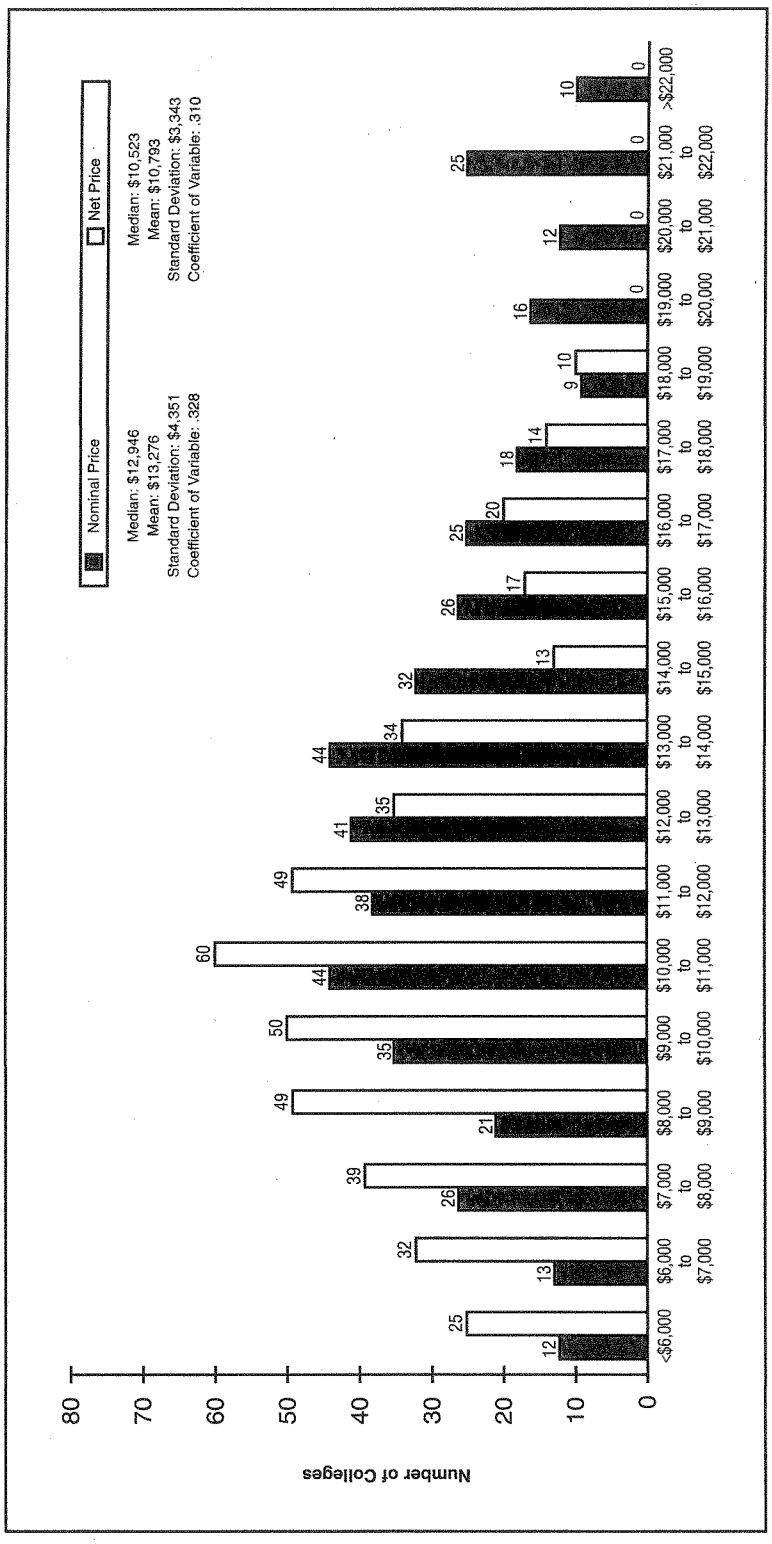

TABLE 4
Aspects of Financial Aid for Needy Full-Time Freshmen Per Recipient Organized by Nominal Price Quintile, Academic Year 1991-92

	Lowest Quintile	Second Quintile	Middle Quintile	Fourth Quintile	Highest Quintile	All
Number of Colleges	89	90	89	90	89	447
Median Average Total Aid	$6,281	$7,876	$9,110	$10,310	$13,795	$9,024
Median Average Self-Help	2,184	2,927	3,178	3,189	3,221	2,901
Median Average Grant	3,787	4,842	5,822	7,120	10,665	5,822
Median Average Externally-Funded Grant	2,156	2,438	2,400	2,060	1,989	2,190
Median Average College-Funded Grant	1,410	2,168	3,188	4,795	8,347	3,400

Sources: Same as Table 1 on page 43.

selective colleges. Available evidence points to a positive correlation between a family's wealth and the student's academic qualifications most highly valued by highly selective colleges.[5] For this reason, unless more selective colleges make extraordinary offsetting recruiting efforts, they are apt to attract a less needy population of students than less selective colleges.

Further, it has been suggested that differences in admissions selectivity could affect the competitive pressure felt by colleges. In a period of decline in numbers of high-school graduates, Zemsky and Oedel (1983) have suggested that the deeper applicant pool at more selective colleges is a cushion. These colleges only need to go a bit deeper into their pools to arrive at their desired class size. Zemsky and Oedel anticipated that it would be less selective colleges, many of which have shallow pools of their own, that would bear the brunt of the decline in high school graduates.[6] The result may be more vigorous competition, particularly among the less selective colleges, and one result of the increased competition may be sharp increases in college-funded grant aid.

More generally, admissions selectivity is likely to have a strong impact on the college's nominal price: both as a reflection of students' willingness to pay a higher price to attend a more selective college and as a way to finance educational and administrative services. Such services help keep the college especially attractive to students. More selective colleges are likely to charge higher nominal prices than their less selective counterparts.[7] Thus, some of the impact of admissions selectivity is likely to be felt through nominal price.

Nominal price itself could hypothetically affect discounting. First, like admissions selectivity, nominal price can affect the mix of students who apply and are enrolled at the college. Sticker price shock may deter some students, particularly students from other than high income, wealthy families, from applying to colleges with high prices. This may be due partly to lack of awareness of the substantial aid packages offered to needy accepted students at many colleges. Also, even among students with such awareness, the net cost of aid at high price colleges may be daunting. If so, higher prices may result in a less needy enrolled student population. Further, a primary impact of higher price may be to affect students' perception of the college's quality; and this perception may be prominent in affecting the mix of students attracted to the

college, though the specific nature of the impact on mix is unclear.

Second, for any given mix of students attracted to a college, higher prices will tend to result in a higher percentage of students judged needy and a higher amount of financial aid. Consider two colleges with the same mix of students, same number of students, same methodology for calculating need, etc., the only difference between the two colleges being their nominal prices. The college with the higher price will have a higher percentage of students whose expected family contribution falls short of the cost and who, by that, are judged needy. Further, the amount of need and, presumably, aid will be higher at the higher price college. If self-help expectations and externally-funded grants are not sufficiently higher at the higher price college, it will tend to have a higher amount of college-funded grants.

"Stringent selectivity and high price tend to lead to a lower percentage of needy students."

There is also the possibility that higher-priced, more selective colleges are using different methods than lower-priced, less selective colleges in calculating expected family contribution. The respective roles of price and admissions selectivity are difficult to isolate from one another. A College Board study (Van Dusen and Higginbotham, 1984) conducted in 1983 revealed that in calculating expected parental contributions:

- high tuition and high selectivity colleges were more likely than other private colleges to make adjustments to the Uniform Methodology then prevalent;
- that the changes, especially at high tuition and high selectivity colleges, were typically in the direction of raising the expected parental contribution; and
- that the average amount of upward adjustment was higher at the high tuition and high selectivity colleges than at other colleges.[8]

Similarly, evidence in the Ivy Overlap antitrust case reveals that the Ivy Overlap Group colleges (consisting of the Ivy League colleges plus MIT, all high tuition and highly selective) had collectively adopted a financial aid methodology that differed from the College Board's suggested methodology for colleges in ways which tended to raise students' expected family contribution (U.S. v. Brown University et al., 1992).

In addition to differences in nominal price and admissions selectivity leading to differences across colleges in discounting, other characteristics may also play a role and should be included in a multivariate regression analysis. Higher endowment per student, by providing a college with more resources for student financial aid, may lead to a more generous aid methodology and more grant-oriented (as opposed to self-help) aid packaging. Thus, higher endowment per student could be thought to lead to a higher percentage of students judged needy, a higher average college-funded grant per student, and a higher discount rate.[9]

Environmental conditions may vary from region to region and affect discounting. One such regional characteristic is income level. A second is the extent of competition among colleges. For example, recent competition may have been especially strong in those regions where there has been the sharpest decline in number of high-school graduates. The degree of competition may affect the extent of college-funded grant aid offered and the set price. In the

regressions which follow, regions are represented by dummy variables with no attempt made to identify the underlying regional characteristics influencing the extent of aid.

Table 5 illustrates the results of multivariate regression analysis designed to disentangle the effects of nominal price, admissions selectivity, endowment per student, and region. Regressions are included for three dependent variables reflecting three aspects of college-funded grant aid: the proportion of students judged needy (Table 5A); the amount of an average college-funded grant (Table 5B); and the discount rate, i.e., the ratio of an average college-funded grant to nominal price (Table 5C).

For each of the three dependent variables, two regressions are shown. The first regression for each dependent variable uses each college's *actual* nominal price as an independent variable.[10] The second regression for each dependent variable uses *predicted* nominal price in place of actual nominal price. The approach of the second regressions recognizes that as part of a structural equation specification, actual nominal price may be a function of some of the same variables (particularly admissions selectivity, region, and endowment per student) in the first regressions. If so and if, additionally, the error term in the regression explaining actual price is correlated with the error terms of the first regressions, then the estimates in the first regressions are potentially biased and inconsistent.

"Differences across colleges in the extent of discounting appear related to differences in admissions selectivity, prices, endowment per student, and regional location."

To correct for this potential problem, the *predicted* nominal price from a previous regression is in the second regressions as an "instrumental variable" in place of *actual* nominal price.[11] The disadvantage of this instrumental variable technique is that the standard errors of the estimates tend to increase. Given the potential for biased and inconsistent estimates in the regressions employing actual nominal price, these first regressions should be viewed with caution (Kennedy, 1992, Chapter 10). Nevertheless, these first regressions using actual nominal price should not be ignored; were the structural equations system recursive, as it may be, the estimates using actual nominal price would be unbiased, consistent, and a minimum variance.

Among statistically significant results, regional differences are prominent as captured by dummy variables concerning the omitted New England category. As noted earlier, regional effects may include differences in the extent of competition among colleges, difference in income levels, and a variety of other regional differences. It is left to further work to identify the specific sources of the regional differences. Apparently reflecting the higher resources available to a college for financial aid, higher endowment per student has a statistically significant positive effect on average college-funded grants and on discount rates.

Controlling for other characteristics of the colleges, higher price is associated with a higher average college-funded grant, a higher discount rate, and a lower percentage of students judged needy.[12] As previously suggested, a plausible interpretation is that higher prices so discourage enrollment of lower income/lower wealth students that, controlling for the other influences, fewer students are judged needy. It may also be the case that, for any given student, the higher price colleges are tending to use aid methodologies typically

TABLE 5A
Proportion of Full-Time Freshmen Judged Needy by College

Dependent Variable: Ratio of Number of Needy Full-Time Freshmen to Number of Full-Time Freshmen
Omitted Category for Admissions Selectivity: Less Competitive
Omitted Category for Region: New England

Independent Variables	Regression 1	Regression 2
Constant	.836***	1.08***
	(19.58)	(12.88)
Nominal Price	-.00893***	
	(-3.38)	
Predicted Nominal Price		-.0270***
		(-4.72)
Endowment Per Student	-.000170	.000139
	(-0.84)	(0.67)
Most Competitive	-.184***	-.0653
	(-4.10)	(-1.18)
Highly Competitive	-.147***	-.0107
	(-4.32)	(-0.21)
Very Competitive	-.0592**	.0122
	(-2.41)	(0.40)
Competitive	-.0476**	-.0180
	(-2.51)	(-0.88)
Middle Atlantic	.0479*	.00813
	(1.84)	(0.28)
East North Central	.0617**	-.000354
	(2.25)	(-0.01)
West North Central	.0691**	-.0194
	(2.30)	(-0.51)
South Atlantic	-.0813***	-.139***
	(-3.08)	(-4.52)
East South Central	.0142	-.111**
	(0.38)	(-2.24)
West South Central	-.0848**	-.210***
	(-2.20)	(-4.16)
Pacific	-.0494	-.0331
	(-1.33)	(-1.07)
R^2	.38	.41
Adjusted R^2	.36	.39
F	19.2***	19.7***
# of Colleges	418	377

* Indicates statistical significance at 90% confidence level.
** Indicates statistical significance at 95% confidence level.
*** Indicates statistical significance at 99% confidence level.
T-statistic in parentheses below estimated coefficient.

TABLE 5B
Multivariate Regressions Explaining Average College-Funded Grant

Dependent Variable: Average College-Funded Grant Per Full-Time Freshman (in dollars)
Omitted Category for Admissions Selectivity: Less Competitive
Omitted Category for Region: New England

Independent Variables	Regression 1	Regression 2
Constant	-1736***	-1310*
	(-6.26)	(-1.75)
Nominal Price	307.1***	
	(17.93)	
Predicted Nominal Price		274.3***
		(5.35)
Endowment Per Student	4.124***	4.632**
	(3.15)	(2.51)
Most Competitive	-1658***	-1400***
	(-5.71)	(-2.83)
Highly Competitive	-681.5***	-461.0
	(-3.09)	(-1.04)
Very Competitive	-69.74	37.42
	(-0.44)	(0.14)
Competitive	-183.7	-139.0
	(-1.49)	(-0.76)
Middle Atlantic	149.0	120.1
	(0.88)	(0.47)
East North Central	682.6***	622.2**
	(3.84)	(2.15)
West North Central	666.5***	515.9
	3.42)	(1.50)
South Atlantic	-188.2	-297.1
	(-1.10)	(-1.08)
East South Central	605.3**	444.2
	(2.47)	(1.00)
West South Central	310.8	119.5
	(1.25)	(0.26)
Pacific	346.4*	349.6
	(1.76)	(1.26)
R^2	.67	.43
Adjusted R^2	.66	.41
F	62.3***	21.0***
# of Colleges	418	377

* Indicates statistical significance at 90% confidence level.
** Indicates statistical significance at 95% confidence level.
*** Indicates statistical significance at 99% confidence level.
T-statistic in parentheses below estimated coefficient.

TABLE 5C
Multivariate Regressions Explaining Discount Rate

Dependent Variable: Discount Rate (Ratio of Average College-Funded Grant Per Full-Time Freshman to Nominal Price)
Omitted Category for Admissions Selectivity: Less Competitive
Omitted Category for Region: New England

Independent Variables	Regression 1	Regression 2
Constant	.0255	.0559
	(1.21)	(1.21)
Nominal Price	.0102***	
	(7.89)	
Predicted Nominal Price		.00791**
		(2.50)
Endowment Per Student	.000210**	.000248**
	(2.11)	(2.18)
Most Competitive	-.101***	-.0852***
	(-4.58)	(-2.78)
Highly Competitive	-.0537***	-.0399
	(-3.21)	(-1.45)
Very Competitive	.000987	.00548
	(0.08)	(0.32)
Competitive	-.00915	-.00730
	(-0.98)	(-0.65)
Middle Atlantic	.0155	.0152
	(1.21)	(0.96)
East North Central	.0553***	.0529***
	(4.11)	(2.95)
West North Central	.0681***	.0587***
	(4.61)	(2.76)
South Atlantic	-.0135	-.0169
	(-1.04)	(-0.99)
East South Central	.0535***	.0460*
	(2.88)	(1.67)
West South Central	.0229	.0119
	(1.21)	(0.43)
Pacific	.0256*	.0287*
	(1.72)	(1.67)
R^2	.31	.20
Adjusted R^2	.29	.17
F	14.0***	7.00***
# of Colleges	418	377

* Indicates statistical significance at 90% confidence level.
** Indicates statistical significance at 95% confidence level.
*** Indicates statistical significance at 99% confidence level.
T-statistic in parentheses below estimated coefficient.

yielding higher calculations of students' expected family contribution. Yet, average college-funded grant and discount rates tend to be higher at these higher price colleges, perhaps because those students with need tend to have greater need than at lower price colleges.

A final set of results looks at the role of admissions selectivity. The admissions selectivity categories for the colleges represented in the regressions are, as characterized by Barron's: most competitive, highly competitive, very competitive, competitive, and less competitive. Dummy variables are used to represent these categories in the regressions. Relative to the less competitive admissions category (which is the omitted category for the dummy variables), the most competitive admissions policies tend to lead, *ceteris paribus*:

- To a lower percentage of students judged needy;
- To a lower average college-funded grant; and
- A lower discount rate.

These tendencies are also present for the highly competitive category relative to the less competitive category, but the estimates of the impact of the highly competitive category reach statistical significance only in the regressions using actual price.

As an example of how these results can be used, consider a most competitive college in New England with the most competitive colleges' median nominal price of $21,545 and median endowment per student of $101,426. Also, consider a competitive college in New England with the competitive colleges' median nominal price of $11,410 and median endowment per student of $6,732. Using the point estimates of the instrumental variable regressions, the predicted percentage of students judged needy, average college-funded grant, and discount rate, respectively, are as follows: 44.7%, $3,670, and 16.6% at the most competitive college; and 75.2%, $1,712 and 14.1% at the competitive college. Although more selective admissions, *ceteris paribus,* tends to lead to lower average college-funded grants and lower discount rates, the impact of high tuition–positively correlated with more selective admissions–leads, overall, to higher average college-funded grants and higher discount rates at such colleges.

Discounting Affected By Selectivity, Tuition, Endowment, And Location

Conclusions drawn from this study are limited by the data's focus on aid given to full-time, needy freshmen. The competitive struggle for attracting new students and the discounts offered to freshmen seems to be at the cutting edge of college rivalry for students. However, a different picture might have emerged were similar data available for non-freshmen, for part-time students, and for aid to non-needy students. Nevertheless, because colleges do differ substantially from one another in the extent of their discounting, the results demonstrate the potential importance of observing prices and revenue *net of college grants.*

A characterization of differences based on nominal price has the potential for creating a misleading picture. Discounting differences must be considered if one is to provide an accurate picture of the differences which exist among colleges in the actual average revenue received from undergraduates.

More specifically, for the academic year 1991-92, substantial differences

existed among private, not-for-profit, four-year colleges in the percentage of full-time freshmen judged needy, in the average discount in the form of college-funded grants, and in the rate at which the set price is discounted. Because colleges with higher nominal prices tend to have higher discount rates, a somewhat tighter distribution exists for colleges' net prices than for their nominal prices. Yet, even after netting out the impact of discounting, net prices are still substantially dispersed across colleges.

Differences across colleges in the extent of discounting appear related to differences in admissions selectivity, nominal prices, endowment per student, and regional location. For those who admire the efforts by many selective, high price colleges to offer substantial aid packages to needy students and to ignore need in their admissions decisions, there is a challenging irony. One reason why many of these colleges can sustain such policies and aid packaging is that stringent selectivity and high nominal prices tend to lead to a lower percentage of needy students. If this were not so, policies providing substantial aid packages to the needy at many of these most selective, high price colleges might not be broadly sustainable. With lower selectivity colleges apparently attracting a more needy population of students, the resulting financial stress placed on many of these colleges is also worthy of consideration.

Notes

[1] Peterson's Freshman Financial Aid Database is compiled, owned, and copyrighted by Peterson's Guides, Inc.; all rights are reserved by Peterson's.

[2] Because this study focuses on the net prices received by the colleges, the net prices are net of college-funded grants but not net of externally-funded grants or loans. For example, externally-funded grants and loans are part of the net price received by the college from the student. Were this study to focus on net price from the perspective of students, it would be important to net out externally-funded grants and the subsidy value of loans because both reduce the net price from a student's perspective.

In this study, excluded from college-funded grants and included in externally-funded grants are grants that are college-administered but funded from the outside, an example being Supplemental Educational Opportunity Grants. Further, college-funded grants refer to those grants funded by the colleges regardless of the source of the college funds. For example, no distinction is made between college grants funded from restricted endowment versus college grants funded from the college's operational revenue. An example of a different approach is that of Breneman (1994), who does not include as "discounts" the part of college grants funded from restricted endowment.

[3] Specifically, throughout this paper, nominal price = tuition + mandatory fees + (room and board)(fraction of full-time freshmen living in college housing). For example, if tuition is $12,000, mandatory fees are $500, room and board is $4,000, and 80% of the freshmen are living in college housing, then nominal price = $12,000 + $500 + (0.80)($4,000) = $15,700. A focus of this paper is on the difference between what the college appears to be charging students versus what the college is actually collecting. Nominally, the college is collecting: tuition, fees, room and board from students living in college housing; and tuition and fees from students not living in college housing. The weighted average is what is here designated as nominal price.

For students living in college housing, whatever the college is providing in the way of college-funded grant aid is as much a discount from the room and board component as from the tuition and fees component. Thus, the discount rate calculated is taken as a percentage of the nominal price, including (as described above) a room and board component for students living in college housing. An earlier version of this article included two additional calculations of the discount rate: one using the sum of tuition and fees as the denominator; and the other using the sum of tuition, fees, room and board (disregarding the percentage of students living in college housing) as the denominator. The general pattern of discount

rates was the same using these two other calculations as using what is defined in this paper as nominal price.

[4] Note that the average college-funded grant is per full-time freshman, not per recipient. Average college-funded grant per full-time freshman is equal to an average college-funded grant per recipient multiplied by the fraction of full-time freshmen receiving aid. Also, the median discount rate does not correspond precisely to a median average college-funded grant divided by median nominal price since these medians are occurring at different colleges. Similarly, median average grant and median average self-help do not sum to median average total aid, and median average college-funded grant and a median average externally-funded grant do not sum to a median average grant.

[5] See, for example, the positive correlation between SAT scores and family income level implicit in Tables 3.4, A.1, and A.2 of Zemsky and Oedel (1983).

[6] Zemsky and Oedel (1983, pp. 88-89) note that some of the more selective institutions, particularly private research universities, could also be quite vulnerable to the possibility of enrollment declines. One is also reminded of a point emphasized by Breneman and Bowen: many highly selective colleges could readily reach their respective target class sizes with lower college-funded grant expenditures than they actually incur. These colleges use "unfunded student aid. . . not as a tuition discount to meet the school's enrollment target, but as an educational investment in the quality and diversity of the student body" (Breneman, 1994, p. 39). These highly selective colleges, using discounts primarily to enhance quality and diversity, might be expected to react differently from less selective colleges to prospective or actual declines in student applications.

[7] As noted in Basch (1995), while more selective colleges tend to have higher nominal price levels, the percentage increase in prices at the most selective colleges tended to be lower than at the less selective colleges over the 1989-94 period.

[8] A referee has made the interesting observation that the design of such upward revisions at high tuition, high selectivity colleges primarily affect more affluent families.

[9] McPherson et al. (1989) emphasize the importance of differences in colleges' endowment per student in explaining differences in colleges' expenditure and revenue behavior from 1978-79 to 1985-86.

[10] In the regressions, the units for nominal price (predicted and actual) are thousands of dollars.

The rankings used are those published by Barron's for academic year 1989-90, which was the last academic year prior to 1991-92 for which Barron's admissions selectivity rankings were available (Barron's, 1990). The rankings for 1991-92 itself were not used in order to avoid the possibility that the discounting by colleges in 1991-92 was itself an influence on the 1991-92 selectivity rankings.

Endowment per student is calculated as the market value of the college's endowment as of June 30, 1991 (the end of the previous academic year), divided by the full-time equivalent number of students attending the college during the Fall 1991 semester. The endowment data are from the Finance Survey FY 1992 of IPEDS, and the enrollment data are from the Fall Enrollment Survey 1991 of IPEDS. For full-time equivalency, each part-time student is counted as one-third of a full-time equivalent. In the regressions, the units for endowment per student are thousands of dollars.

Because the Mountain region was represented by only 7 colleges and because the noncompetitive category was represented by only 5 colleges, these 12 colleges were excluded from the regressions. No effort is made to estimate the impact of the Mountain region or noncompetitive admissions selectivity. With 7 Mountain region and 5 noncompetitive colleges not included in the regressions and with endowment per student data not available for another 17 colleges, 418 colleges are included in the first regressions for each dependent variable.

The omission of colleges from the Mountain region and noncompetitive category should not be confused with the dummy variables omitted from the regressions to avoid the dummy variable trap. As noted in Table 5, the regional category omitted is New England and the admissions selectivity category omitted is less competitive. Colleges from New England and the less competitive category are, of course, included in the regressions.

[11] The dependent variable in this previous regression is nominal price and the independent variables (in addition to a constant term) are admissions selectivity, region, undergraduate enrollment, average faculty salary, and endowment per student. Due to unavailability of undergraduate enrollment or faculty salary data for 41 colleges, only 377 colleges are included in the regressions using the instrumental variable (versus 418 in the first regressions).

[12] An exploration was also made of including nominal price (actual or predicted) in a quadratic specification rather than a linear specification. For ease of presentation and because the main thrust of the results is similar, only the linear specification results are shown in Table 5.

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